

**HIGHER EDUCATION
MARKET SECTOR**

Presentation to:

**INFORMATION ASSOCIATES, INC.
Rochester, New York**

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President
INPUT**



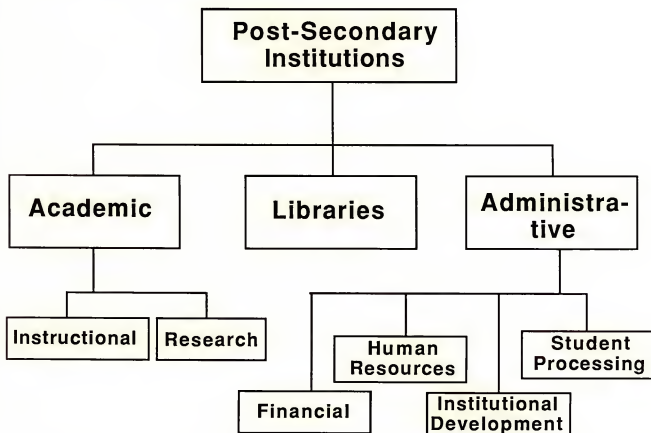
OUTLINE

- **Overview**
 - **Hardware**
 - **Software**
 - **System Integration**
 - **Summary**
 - **Opportunities**
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OVERVIEW

HIGHER EDUCATION MARKET APPLICATIONS



MARKET CHARACTERISTICS

- **Universities Appointing CIOs**
 - **Computer Center Staff Supports User Departments**
 - **No "Single Vendor" Preference**
 - **Limited Integrated Software**
 - **Lack of Hardware or Software Standards**
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SALES CHARACTERISTICS

- **"Reference" Sell**
 - **User Committees Involved**
 - **Long Sales Cycle**
 - **Long Implementation Cycle**
 - **Extensive Customer Support**
 - **Inexpensive Software Modules**
 - **Combine Modules to Form System**
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ROLE OF COMPUTERS IN HIGHER EDUCATION

- **Demand Drivers**
 - **Attract Quality Faculty**
 - **Attract the Best Students**
 - **Provide Marketing Information**
 - **Offer Improved Service**
 - **Demand Brakes**
 - **Budget Fluctuations**
 - **Low Perceived Importance of Computers**
 - **Prognosis: Good**
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TECHNOLOGY TRENDS IN THE HIGHER EDUCATION MARKET

- **From In-House to Vendor-Developed Software**
 - **OA/E-Mail**
 - **Increasing in Administrative Offices**
 - **Requires Top Management Involvement**
 - **"PCs = Pocket Calculator"**
 - **More PC-Based Application Software Needed**
 - **Progressive (Large?) Institutions**
 - **PCs Beyond Business and Engineering**
 - **Plan Extensive Networks**
 - **Consider RDBMS**
 - **Own Voice/Data Comm Facilities**
-

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of financial reporting and auditing. The text outlines various methods and tools that can be used to ensure the integrity and reliability of the data collected.

2. The second part of the document focuses on the role of technology in modern record-keeping. It highlights how digital solutions, such as cloud storage and data management systems, can significantly improve the efficiency and security of record-keeping processes. The text also addresses the challenges associated with digital records, such as data loss and cyber threats, and provides recommendations for mitigating these risks.

3. The third part of the document discusses the legal and regulatory requirements for record-keeping. It outlines the various laws and regulations that govern the collection, storage, and disposal of records, and provides guidance on how to ensure compliance with these requirements. The text also discusses the importance of data retention policies and the need to regularly review and update these policies to reflect changes in the legal and regulatory landscape.

4. The fourth part of the document focuses on the importance of data security and privacy. It discusses the various threats to data security, such as malware, phishing, and insider threats, and provides recommendations for implementing robust security measures to protect sensitive information. The text also discusses the importance of data privacy and the need to ensure that personal data is handled in a responsible and transparent manner.

5. The fifth part of the document discusses the importance of data backup and recovery. It outlines the various methods and tools that can be used to create and maintain backups of critical data, and provides guidance on how to test and verify the recovery process. The text also discusses the importance of disaster recovery planning and the need to have a clear and concise plan in place to ensure that data can be recovered in the event of a disaster.

6. The sixth part of the document discusses the importance of data archiving and preservation. It outlines the various methods and tools that can be used to archive and preserve data for long-term storage, and provides guidance on how to ensure the integrity and reliability of the archived data. The text also discusses the importance of data preservation in the context of legal and regulatory requirements, and the need to ensure that data is preserved in a manner that allows it to be accessed and used in the future.

7. The seventh part of the document discusses the importance of data sharing and collaboration. It outlines the various methods and tools that can be used to share and collaborate on data, and provides guidance on how to ensure the security and privacy of the shared data. The text also discusses the importance of data sharing in the context of research and innovation, and the need to ensure that data is shared in a manner that allows it to be used to advance knowledge and understanding.

8. The eighth part of the document discusses the importance of data governance and management. It outlines the various methods and tools that can be used to manage and govern data, and provides guidance on how to ensure the integrity and reliability of the data. The text also discusses the importance of data governance in the context of legal and regulatory requirements, and the need to ensure that data is managed in a manner that allows it to be used in a responsible and transparent manner.

9. The ninth part of the document discusses the importance of data analytics and reporting. It outlines the various methods and tools that can be used to analyze and report on data, and provides guidance on how to ensure the accuracy and reliability of the data. The text also discusses the importance of data analytics in the context of business decision-making, and the need to ensure that data is analyzed and reported in a manner that allows it to be used to inform decisions.

10. The tenth part of the document discusses the importance of data security and privacy. It outlines the various methods and tools that can be used to protect data from security threats, and provides guidance on how to ensure the security and privacy of the data. The text also discusses the importance of data security and privacy in the context of legal and regulatory requirements, and the need to ensure that data is protected in a manner that allows it to be used in a responsible and transparent manner.

CHANGING ROLE OF MIS DIRECTOR

- From "Techie" to CIO
 - 1986: Manage Decentralization
 of Information
 - 1988-1990: Manage Recentralization
 of Information
-



TRENDS IN ACADEMIC COMPUTING (I)

- **DEC to Still Control**
 - **Increased Third Party Software**
 - **Favorable Marketing Agreements**
 - **Networks**
 - **"Next Generation Buyer" Exposure**
 - **DEC Preferred to IBM**
-



TRENDS IN ACADEMIC COMPUTING (II)

- **IBM Inroads Expected**
 - **9370 Minicomputer**
 - **Improved Networking**
 - **Improved OS Migration**
-



TRENDS IN ADMINISTRATIVE COMPUTING

- Continued Control by IBM
 - IBM Vulnerabilities
 - Lack of OS Upgrade Path
 - Limited New Third Party Software
 - Recentralization of Computing
 - MIS Director/CIO in Control
 - IBM Invented MIS/CIO Sell
-



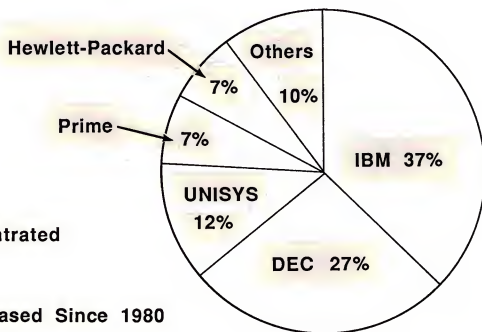
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HARDWARE



COMPUTER HARDWARE IN HIGHER EDUCATION MARKET SEGMENT

COMPUTER SYSTEMS
SHIPPED, 1985



- Highly Concentrated

- DEC

- Share Increased Since 1980
- 1986: "Hot" Company

Source: CI



DEC HARDWARE INSTALLATIONS

- Total U.S. VAX Installations = 41,500
 - U.S. Education Sector VAX Installations = 5,800
 - Percent Installed in Admini-
strative Computing = 30-35%
 - VAX Is Strong in Scientific/Technical Markets
 - DEC Donated Numerous VAXes for Academic Computing
-



**IBM AND DEC ACCOUNT BASES IN THE
HIGHER EDUCATION MARKET SEGMENT**

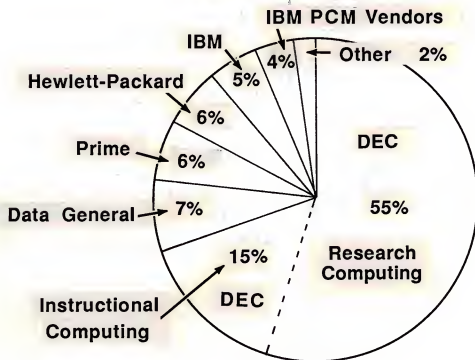
VENDOR	OWNERSHIP OF INSTITUTION		TYPE OF INSTITUTION			SIZE OF INSTITUTION		
	Public	Private	4-Year College	2-Year College	Univer- sity	Large	Medium	Small
IBM	X		X	X	X	X	X	
DEC		X	X	X			X	X

- OVERLAP: Medium-Size Colleges



1985 VENDOR MARKET SHARE ACADEMIC COMPUTING

HIGHER EDUCATION ACADEMIC COMPUTING MARKET SHARE, 1985



Source: CI



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SOFTWARE



**SOFTWARE FOR HIGHER
EDUCATION ADMINISTRATION (I)**

- **2 Classes**
 - **Mainframe/Minicomputer**
 - **Microcomputer**
 - **Administrative Software**
 - **>90% Is Mainframe/Mini Based**
 - **1991: \$101 Million**
 - **AAGR: 13%**
-



SOFTWARE FOR HIGHER EDUCATION ADMINISTRATION (II)

- **Users:**
 - "Mix and Match" Approach
 - Little Integrated Software
 - Lack of Standards at Each School
 - **Demand Drivers:**
 - Replacement of Non-Integrated Software
 - Upgrades
 - Improved Asset Management
 - Market and Demographic Data
 - **5 Administrative Applications (Follow)**
-



HUMAN RESOURCES

- Demand Drivers
 - Human Resources as Profit Center
 - "Cafeteria Style" Benefits Administration
 - Government Reporting Requirements
 - Employee Training and Education Administration
 - Tax Law Changes
 - Prognosis: Good
-



STUDENT LOAN ADMINISTRATION

- Demand Drivers
 - Stringent Regulatory Requirements
 - Paperwork Intensive Applications
 - Growth of Government-Backed Student Loans
 - Timely Loan Processing and Followup
 - Up-to-the-Minute Reports
 - Demand Brakes
 - Gramm-Rudman-Hollings Effect on Financial Aid
 - Prognosis: Good
-



INSTITUTIONAL DEVELOPMENT

- **Demand Drivers**
 - **Tuition has Never Covered Expenses**
 - **Expand Funding Sources**
 - **Track and Followup Funding Sources**
 - **Measureable Results (\$)**
 - **Integrate with Accounting Software**
 - **Demand Brakes**
 - **Lower Priority**
 - **Limited Integrated Software Available**
 - **Prognosis: Fair**
-



STUDENT REGISTRATION

- Demand Drivers
 - Service Differentiator
 - Improved Utilization of Facilities, Professors, and Teaching Assistants
 - Requires RDBMS
 - Dearth of Integrated Software
 - Prognosis: Very Good
-



ACCOUNTING/FINANCIAL SYSTEMS

- **Demand Drivers**
 - **Heart of Administrative Computing**
 - **Key User Applications**
 - **Purchasing**
 - **Job Tracking**
 - **Vehicle Management/Maintenance**
 - **Property Control**
 - **Accounts Receivable**
 - **Prognosis: Good**
-

THE EFFECTS OF THE 2008 FINANCIAL CRISIS ON THE UK'S SMALL AND MEDIUM-SIZED ENTERPRISES

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Dr. David Storey is a senior lecturer in the School of Management, University of Northumbria, Newcastle, UK. He has published extensively in the area of human resource management and organisational behaviour.

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RELATIONAL DBMS SOFTWARE IN HIGHER EDUCATION

- **Large Schools Interested**
 - **Installed DBMS Software**
 - **IMS/IDMS in 12% of Large Schools**
 - **Strong Competition by Independents**
 - **Must Rewrite to RDBMS**
 - **RDBMS Administrative Applications**
 - **Human Resources**
 - **Loan Administration**
 - **Development**
 - **Registration**
 - **Accounting/Financial**
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SYSTEM INTEGRATION



SYSTEM INTEGRATION (I)

- **Demand Drivers**
 - **Hardware Integration**
 - **Software Integration**
 - **Demand Brakes**
 - **Limited Communications Requirements**
 - **Best Cases: Multiple Campus or Statewide Integration**
 - **Worst Case: Single LAN**
 - **Most Likely Case: Multiple LANs**
 - **Unanswered Questions**
 - **"Ownership" of Data in Shared Data Processing Environment**
 - **Data Security**
-



SYSTEM INTEGRATION (II)

- **Market Realities**
 - **Need: Software, Not Hardware, Integration**
 - **Limited Number of Target Establishments (Approximately 1,000)**
 - **Belief by Larger Schools of Greater In-House Capability**
 - **Heavily Discounted/Donated Equipment Leads to Expectation of Low-Cost**
 - **Prognosis: Fair**
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SUMMARY

- Technology's Role: Help Attract Quality
 - Long, Tough Sell
 - Requires Extensive Support
 - Administration Software
 - 13% AAGR
 - \$100 Million in 1991
 - DEC Dominates Academic Computing; IBM Leads in Administrative Computing
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SPECIALIZED INTEGRATION OPPORTUNITIES

- **University Hospitals**
 - **Affiliated Research Institutions**
 - **Supercomputer Centers**
 - **"Media Integration" at Libraries**
 - **Newspaper**
 - **Books**
 - **Magazines**
 - **Pamphlets**
 - **Microfiche**
 - **Diskettes**
 - **CD-ROM**
-



OTHER OPPORTUNITIES

- **Good**
 - **Administrative Software**
 - **Relational DBMS**
 - **Software Integration**
 - **Limited**
 - **Hardware/Communication Integration**
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